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BY

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PORTABLE ELECTRIC LAMPS FOR ANIMAL HAULAGE IN ALABAMA[1]

By F. E. Cash[2] and C. E. Saxon[3]

PURPOSE OF REPORT

Adequate lighting for all mining operations would unquestionably tend to promote both safety and efficiency; this would be true not only for men but also for the animals that man impresses into service in mines. The Markeeta Coal Co. and the Alabama Fuel & Iron Co., both operating mines in Alabama, have found that equipping mine mules with portable electric lights is more efficient, much more humane, and far more safe for both men and animals than the more or less usual method of forcing the animal to do its work essentially in darkness.

This report is intended to give the mining industry data that will aid in trying to bring about safe and efficient operation of mines.

ACKNOWLEDGMENTS

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EXPERIENCE OF TWO COMPANIES

The eight mines operated by the Alabama Fuel & Iron Co. and one operated by the Markeeta Coal Co. in Jefferson and St. Clair Counties, Ala., are the only mines in Alabama where mules are provided with portable electric lights, and there are few if any mines in other States in which this system is in use.

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These two companies are convinced that equipping all mine mules with good lights decreases underground haulage cost by animals by prolonging the useful life of the animals, increasing their efficiency, lessening haulage wrecks and delays on haulage, and increasing production. Last but not least of the advantages would be the more humane treatment of the animals.

Mining Conditions

The nine mines are developed by slopes along the dip of the coal bed, with double-room entries on 200- to 300-foot centers turned right and left off the slopes and with approximately 1 per cent grade in favor of the loads. Rooms are driven up or diagonally up the pitch from these entries.

A surface hoist delivers the empties from the surface to the entry sidetracks at the slope and pulls the loads to the surface. From these sidetracks, mules pull one to four wooden cars, each of which holds 1-1/2 to 2-1/2 tons of coal, deliver the empties to the rooms and entry faces, and pull the loads to the slope sidetracks. The mule haul varies from 100 to 3,000 feet; there are no locomotives or trolley wires in any of these nine mines, seven of which are rated as gassy and two as nongassy by the Alabama State Mining Department.

All employees in eight of the mines use permissible electric cap lamps; in one open lights are used.

All stables are on the surface and the mules are taken into the mines at the beginning of the working shift and brought out at the end of it; this is the usual practice at drift or gently dipping slope mines, and it is beneficial to the animals, lessens fouling of the mine air, reduces stable attendance, and eliminates a considerable underground fire risk from flammable materials.

HAULAGE IN INDIVIDUAL MINES

Markeeta Mine

The Markeeta Coal Co. operates one mine which produces about 375 tons of coal per day with eight mules engaged in haulage; the mules average 47 tons of coal hauled per animal per day. The mine was opened in July 1928, and electric mule lamps were put into use on March 1, 1932; prior to installing the mule lights, three mules were killed and several injured, but since the mule lights have been in use no animal has been killed or injured in the mine.

Acmar Mines

The Alabama Fuel & Iron Co. is operating three mines on the Acmar division (No. 2, No. 5, and No. 6), producing about 2,500 tons of coal per day with 50 mules; every mule, therefore, hauls an average of about 50 tons per day. During 1927, two electric mule lamps were put into use as an experiment and this number was gradually increased until on January 1, 1932, all of the mules employed in these mines were equipped with lights; before installing

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mule lights, about nine mules per year were killed in the mines of the Acmar division, and several times as many were injured. During 1932 only one mule was killed in these three mines, a decided improvement over the record before the mule lights were adopted.

Margaret Mines

The Alabama Fuel & Iron Co. is operating two mines in the Margaret division (No. 3 and No. 5), producing about 1,800 tons of coal per day with haulage done by 30 mules; hence every mule pulls an average of about 60 tons per day. This division was completely equipped with mule lights on January 1, 1932; during 1932 but one mule was killed in these mines, while previously two or more mules were killed each year.

Overton Mines

The Alabama Fuel & Iron Co. is operating three mines on the Overton division (No. 1, No. 2, and Shades Valley), producing about 1,200 tons per day with haulage done by 21 mules; hence each mule hauls an average of about 57 tons per day. This division was fully equipped with electric mule lamps on January 1, 1932. Five mules were killed in 1929, 2 in 1930, and 2 in 1931. In 1932 these mines were responsible for the death of but one mule; this one was electrocuted when a car wreck pulled down a 220-volt, a.c., feeder cable.

Lamps Used

The Markeeta mine uses model C Wheat mule lamps carried in a leather case buckled to the mule's collar. The lamps are carried into the mine by the driver and are attached to the mule upon reaching the slope sidetrack. The total weight of the lamp, case, and strap, is 6 to 7 pounds.

In the Overton mines, Edison lamps are used and carried in a case similar to that used at the Markeeta mine, but at the Overton mines, the mules carry the collar and the lamp into and out of the mines; this method gives the mules the advantage of having their own light when traveling into and out of the mine.

The Margaret and Acmar divisions of the Alabama Fuel & Iron Co. use super-Wheat lamps carried in an aluminum case buckled to the mule collars; this case increases the weight 2 to 3 pounds. These lamps are also worn into and out of the mines by the mules.

These mule lamps differ from the permissible type worn by men in that they have no cord from the battery to the headpiece, the headpiece being fastened direct to the side of the battery case.

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Mule Accident Experience

At the Markeeta mine, one mule was killed each year from 1929 to 1931. In 1932, after mule lamps had been provided, no mules were injured or killed. On this basis, the company has saved a mule a year by the installation of 10 mule lamps.

At the Acmar mines, the mules killed in 1930 cost $4,500, and $2,500 in 1931; in 1932, or after the mule lamps had been installed, the killing of mules in these mines cost but $100. This mule-lamp installation was begun with two lamps in 1927 and completed with 65 lamps in December 1931.

At the Margaret mines, the mule-lamp installation, 32 in number, was completed in December 1931. Two mules were killed in 1929 and cost $315; two in 1930 cost $430; no mules were killed in 1931, but in 1932 the death of one mule cost $100.

At the Overton mines in 1929, five mules killed cost $525; in 1930, two mules cost $150; in 1931, two cost $300, and in 1932 one cost $55. This mule-lamp installation was completed in December 1931.

SUMMARY

The Markeeta Coal Co., working eight mules, averaged one death each year before using lights and none after they were installed.

The Alabama Fuel & Iron Co. completed the installation of 121 mule lamps for 101 mules worked in all divisions in January 1, 1932. Since that time it is considered a rule violation to work a mule without a good light; if a lamp fails or if the light gets dim, the rule is that the mule must not be worked until another light is procured.

During 1930 this company had 16 mules killed, 11 in 1931 and 3 in 1932. These mules were being killed largely by being run over by cars, by running into standing cars, or by falling and breaking legs. Seldom are the mules killed outright by these causes, but a mule with a broken leg must be killed (as is the case with any large animal), hauled out of the mine, and buried.

The total cost of mules killed in 1930 was $5,080, $2,800 in 1931 and only $255 in 1932. These are the direct costs only and do not include numerous incidentals such as reduced tonnage or cost of removing dead mules.

The companies attribute the decrease in number of mules killed and the money saved during 1932 over previous years largely to the use of portable electric lights on all mules.

In addition to this saving in direct costs, the companies found during 1932 (or the first year of complete installation) that the mules not only get hurt less often and less severely, but they travel faster, pull more coal because they can see, and are often able to protect themselves as well as their drivers and in many cases the mine timbers or other property.

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With two lights on a trip, one on the driver and the other on the mule, the driver is given a better chance to protect not only the mule but also to prevent himself from being injured. The mule not only benefits from additional light, but the drivers themselves suffer fewer accidents--and unquestionably many of the haulage accidents suffered by mule drivers are due to lack of light given to the animal.

CONCLUSION

If two coal-mining companies operating nine mines in Alabama by the use of 131 portable electric mule lights can save $2,000 or more per year in cost of mules killed, and in addition can haul more coal with considerably fewer wrecks and accidents to drivers, then all mining companies using animals for haulage should seriously consider the use of similar lighting equipment. Aside from the material gains to be achieved in reduced cost of animal supply or of compensation for injury or death of drivers, in lessened costs due to mine wrecks with possible tearing out of timber and letting down of loose roof, and in increased tonnage hauled per mule or per driver per day, any right-minded mine operator should consider the humanitarian features involved in the vastly increased protection to both animals and their drivers when adequate lights are given by mule-lamp installations.

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